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EIGHTH MONTHLY NARRATIVE REPORT

15 March 1966

REFERENCE DATA

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Job No. 645

REPORTING INTERVAL

10 February 1966 - 10 March 1966

OBJECTIVE ¹

The objectives of this program are to define the operational objectives for automatic screening of photographic intelligence data; to study, test and evaluate the techniques applicable to the problem; and to generate a design for an operational prototype system. Extensive experimentation on existing scanning and processing equipment, coupled with computer simulations of recognition systems, will be used to test the feasibility of several schemes. The final system design will be based upon the results of the techniques study and the operational objectives defined in the program.

1. As discussed with and agreed to between [] and the Technical Representative, work on the first and third objectives was discontinued in December in order that emphasis could be placed on the second.

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Declassification Review by
NGA/DoD

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STATUS OF ACTIVITIES AND ACCOMPLISHMENTS

During the reporting period, work continued on the analysis of the performance of the Integral Scanner and on frequency-domain analysis in memorization and generalization experiments.

Over 4200 samples ranging from simple figures to actual aerial photographs have been tested. Capability for rapid data processing has developed to the point where more than 100 data samples, mounted in super slides (2" x 2"), can be fully processed in one working day.

Efforts, in the testing phase, towards the overall goal of proving the invariance of the integral scanner approach are directed along two lines, the first of which is the investigation of the parameters of the existing integral scanner. Tests have been conducted to examine the information content of single-sweep video signals. Positive and negative transparencies of primitive shapes in varying widths and field sizes, such as straight lines and line intersections, and other simple geometric shapes (e.g., triangles, squares, hexagons, circles, etc.) of a constant area of transmission, have been produced to examine linear and angular resolution. Experiments with scanner noise and scanner repeatability have also been included. Discrimination of simple geometric shapes has shown overall results of better than 88% correct identification in two-class experiments.

Secondly, and more extensively, tests have been conducted on actual aerial photography for identification under varied rotational and translational conditions. Many of these have

been various target-versus-background tests where the target class consists of man-made objects (e.g. buildings, tanks, roads, etc.), and the background class is natural terrain with varying levels of vegetation. Despite the vast range of features involved, the results have still shown approximately 70% correct discrimination under a wide range of rotational and translational test conditions. Further tests between various types of targets, such as runways-versus-roads, one runway-versus-another, roads-versus-bridges and dams, clearings-versus woods, runways-versus-urban areas, etc. have yielded better than 78% correct identification.

Because true representation of the test results in recognition percentages as stated above may be misleading, a statistical analysis of the data is underway to determine the invariance of the recognition rate in both memorization and generalization experiments.

DIFFICULTIES ENCOUNTERED

We have not received any imagery from the Navy.

PROGRAM FOR NEXT INTERVAL

Work will stop on 31 March 1966, and the writing of the final report will begin.

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